

Commonwealth of Kentucky
Division for Air Quality
STATEMENT OF BASIS / SUMMARY

Conditional Major, Construction/Operating
Permit: F-20-020
Diversified Midstream LLC - Myra Compressor Station
275 Beefhide Creek Road
Myra, KY 41549
June 18, 2020

Breyauna Jackson, Reviewer
SOURCE ID: 21-195-00247
AGENCY INTEREST: 44064
ACTIVITY: APE20190001, APE2020001

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SECTION 1 – SOURCE DESCRIPTION

SIC Code and description: 1311, Crude Petroleum and Natural Gas

Single Source Det. ☐ Yes ☒ No If Yes, Affiliated Source AI:

Source-wide Limit ☒ Yes ☐ No If Yes, See Section 4, Table A

28 Source Category ☐ Yes ☒ No If Yes, Category:

County: Pike

Nonattainment Area ☒ N/A ☐ PM₁₀ ☐ PM_{2.5} ☐ CO ☐ NO_x ☐ SO₂ ☐ Ozone ☐ Lead

If yes, list Classification:

PTE* greater than 100 tpy for any criteria air pollutant ☒ Yes ☐ No

If yes, for what pollutant(s)?

☐ PM₁₀ ☐ PM_{2.5} ☐ CO ☐ NO_x ☐ SO₂ ☒ VOC

PTE* greater than 250 tpy for any criteria air pollutant ☐ Yes ☒ No

If yes, for what pollutant(s)?

☐ PM₁₀ ☐ PM_{2.5} ☐ CO ☐ NO_x ☐ SO₂ ☐ VOC

PTE* greater than 10 tpy for any single hazardous air pollutant (HAP) ☐ Yes ☒ No

If yes, list which pollutant(s):

PTE* greater than 25 tpy for combined HAP ☐ Yes ☒ No

*PTE does not include self-imposed emission limitations.

Description of Facility:

Diversified Southern Midstream LLC (Diversified) owns and operates a natural gas compression station in Pike County, Kentucky called the Myra Compressor Station. The station is used to compress natural gas as it is being shipped via pipeline. The facility consists of natural gas fired compressor engines, electric compressor engines, dehydration unit with associated natural gas-fired reboiler and thermal oxidizer, an emergency generator and storage tanks for storage of oil, produced fluids and triethylene glycol (TEG), each with capacity of less than 10,000 gallons.

SECTION 2 – CURRENT APPLICATION AND EMISSION SUMMARY FORM

Permit Number: F-20-020

Activities: APE20190001, APE20200001

Received: 9/17/19; 2/16/20

Application Complete Date(s): 11/19/19; 4/13/20

Permit Action: ☐ Initial ☒ Renewal ☐ Significant Rev ☐ Minor Rev ☒ Administrative

Construction/Modification Requested? ☒ Yes ☐ No

Previous 502(b)(10) or Off-Permit Changes incorporated with this permit action ☐ Yes ☒ No

Description of Action:

APE20190001: The Division received the request from Diversified Southern Midstream, LLC for a revision and renewal of the operating permit F-15-018 R3. The revision includes the replacement of one (1) electric driven engine with a 1900 bhp natural gas-fired rich burn engine and the installation of two (2) 1,000 gallon storage tanks. The facility also requested an update to the description of EP05.

APE20200001: The Division initially received an administrative amendment application 2/16/20 with additional information received 3/4/20 for a name change from Diversified Southern Midstream LLC to Diversified Midstream LLC.

F-20-020 Emission Summary				
Pollutant	2018 Actual (tpy)	Previous PTE F-15-018 R3 (tpy)	Change (tpy)*	PTE** F-20-020
CO	1.26	15.19	33.91	49.10
NO _x	1.47	17.51	16.95	34.46
PT	.061	0.32	0.48	0.80
PM ₁₀	.061	0.32	0.45	0.77
PM _{2.5}	.061	0.32	0.45	0.77
SO ₂	.0045	0.019	0.028	0.047
VOC	2.54	25.01	11.96	36.97
Greenhouse Gases (GHGs)				
Carbon Dioxide	929	3913	5601	9514
Methane	1.54	1.41	0.1	1.51
Nitrous Oxide	1.48	0.0075	0.0105	0.018
CO ₂ Equivalent (CO ₂ e)	1408	3950	5607	9557
Hazardous Air Pollutants (HAPs)				
Total HAPs:		4.09	1.5	5.59
Formaldehyde	0.065	1.4	0.98	2.38
Benzene	0.136	0.35	0.07	0.42
Toluene	0.25	0.81	0.03	0.84
Xylene	0.076	0.45	0.01	0.46

* Change in emissions is due to installation of an engine and storage tanks

**Facility has taken limit on single HAP, combined HAP and VOC emissions to be below major source threshold

SECTION 3 – EMISSIONS, LIMITATIONS AND BASIS

Emission Unit 01 (EP05) Engine #3: 4 Stroke Lean Burn Natural Gas Fired RICE

Initial Construction: 1/1/2004

Process Description:

Caterpillar 3512LE with Oxidation Catalyst; 4 stroke lean burn RICE rated at 810 bhp

Fuel: Natural Gas;

Fuel Consumption: 7,407 BTU/bhp-hr

Control Device: Oxidation Catalyst;

Maximum Operating Rate: 0.0059 mscf/hr

Stack ID: 05

Applicable Regulation:

401 KAR 63:002, Section 2.(4) (eeee) 40 C.F.R. 63.6580 to 63.6675, Tables 1a to 8, and Appendix A (Subpart ZZZZ), *National Emission Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines*. This regulation is applicable to all spark and compression ignition ICE. The unit is considered an existing engine at an area source as the construction of the stationary RICE commenced before June 12, 2006.

Comments:

Manufacturer specifications were used for the calculation of NO_x and CO.

Pursuant to 40 CFR 63.6603(a) and 40 CFR 63, Subpart ZZZZ Table 2d. item 9, the permittee must install an oxidation catalyst to reduce HAP emissions from the stationary RICE.

Pursuant to 40 CFR 63.6640(c) , the permittee must conduct an annual compliance demonstration following the requirement in 40 CFR 63.6640(c)(1) through (7). Initial compliance demonstration was achieved August 6, 2013.

Emission Unit 02 (EP06) Triethylene Glycol (TEG) Dehydration Unit with Reboiler

Initial Construction Date: 5/1/2010

Process Description:

The dehydration unit filters the natural gas and separates excess water with an absorption process using TEG as the absorption medium. The TEG is regenerated using a distillation step and recirculated back through the process. Heat is provided by the natural gas-fired reboiler to regenerate the TEG before it is recirculated back through the process. The natural gas stream from the dehydration unit is then reintroduced into the pipeline to be transported further along the distribution system. Liquid fractions removed from the natural gas via dehydration are stored in a small storage tank at the facility.

Maximum Dehydrator Operating Rate: 1.46 mmscf/hr (35 million standard cubic feet per day)

Reboiler Primary Fuel: Natural Gas;
Control Device: Thermal Oxidizer;
Stack ID#: 06

Reboiler Burner Capacity: 1.5 mmBtu/hr
Control Efficiency: 95%

Applicable Regulation:

401 KAR 59:015, *New Indirect Heat Exchangers*, applicable to indirect heat exchangers having a heat input capacity greater than one (1) million BTU per hour (MMBtu/hr) commenced on or after April 9, 1972 (401 KAR 59:015, Section 2(1)).

401 KAR 63:002, Section 2(4)(x), 40 C.F.R. 63.760 to 63.777, Appendix (Subpart HH), *National Emission Standards for Hazardous Air Pollutants From Oil and Natural Gas Production Facilities*, This regulation applies each triethylene glycol (TEG) dehydration unit at an area sources of HAP emissions.

Comments:

Emission Factors are based on GRI-GLY Calc 4.0 for the dehydration unit and from AP-42, Chapter 1.4 for the Reboiler. The facility submitted a GRI-GLY Calc 4.0 report run August 28, 2019.

The reboiler is subject to limits for PM and SO₂ from 401 KAR 59:015, Section 4 and Section 5. In addition, the reboiler is subject to the requirements from 401 KAR 59:015, Section 7.

Myra Compressor Station does have a TEG dehydration unit. However, because the actual average benzene emissions from the dehydrator vent are less than 0.90 megagrams per year (1.0 tpy), the emissions control and operating standards of 40 CFR 63, Subpart HH do not apply pursuant to 40 CFR 63.764(e)(1)(ii). The permittee is required to keep records of the actual average benzene emissions from the dehydrator [40 CFR 63.774 (d)(1)]

Emission Unit 03 (EP07) Natural Gas Fired Emergency Engine

Initial Constructio: 6/11/2003

Process Description:

Cummins Model GTA855; 4 stroke, rich burn RICE rated at 293 bhp

Fuel: Natural Gas;

Fuel Consumption: 8,181 BTU/bhp-hr

Maximum Operating Rate: 0.0024 mscf/hr;

Control Device: None

Applicable Regulation:

401 KAR 63:002, Section 2(4)(eeee), 40 C.F.R. 63.6580 to 63.6675, Tables 1a to 8, and Appendix A (Subpart ZZZZ), *National Emission Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines*. This regulation is applicable to all spark and compression ignition reciprocating engines. The unit is considered an existing RICE as construction commenced before June 12, 2006.

Note: D.C. Circuit Court [*Delaware v. EPA*, 785 F. 3d 1 (D.C. Cir. 2015)] has vacated the provisions in 40 CFR 63, Subpart ZZZZ that contain the 100-hour exemption for operation of emergency engines for purposes of emergency demand response under 40 CFR 63.6640(f)(2)(ii)-(iii). The D.C. Circuit Court issued the mandate for the vacatur on May 4, 2016.

Comments:

PTE is based on 500 hr/yr. The permittee must meet the requirements from Table 2d, item 5.

Emission Unit 04 (EP08) Engine #5: 4 Stroke Rich Burn Natural Gas Fired RICE

Pollutant	Emission Limit or Standard	Regulatory Basis for Emission Limit or Standard	Emission Factor Used and Basis (lb/mmscf)	Compliance Method
NOx	1.0 g/kW-hr 82 ppmvd @15% O ₂	40 CFR 60.4233(e) & 40 CFR 60.4234	361.21 Catalyst manufacturer guarantee	Purchasing an non-certified engine and demonstrating compliance according to the requirements in 40 CFR 60.4244
CO	2.0 g/kW-hr 270 ppmvd @15% O ₂		722.42 Catalyst manufacturer guarantee	
VOC	0.7 g/kW-hr 60 ppmvd @15% O ₂		252.85 based on allowable under 40 CFR 60, Subaprt JJJJ*	

* As the catalyst manufacturer guarantee is lower than that of allowables from 40 CFR 60, Subpart JJJJ

Initial Construction Date: last quarter 2019

Process Description:

Waukesha L7044 GSI S5 4 Stroke Rich Burn reciprocating engine rated at 1900 bhp @1200 RPM

Fuel: Natural Gas;

Fuel Consumption: 7,063 BTU/bhp-hr

Maximum Operating Rate: 0.01071 mscf/hr;

Control Device: Miratech 3-way catalyst

Engine Manufacture Date: December 2019;

Stack ID: 08

Emission Unit 04 (EP08) Engine #5: 4 Stroke Rich Burn Natural Gas Fired RICE

Applicable Regulation:

401 KAR 63:002, Section 2.(4) (eeee) 40 C.F.R. 63.6580 to 63.6675, Tables 1a to 8, and Appendix A (Subpart ZZZZ), *National Emission Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines*. This regulation is applicable to all spark and compression ignition reciprocating engines.

401 KAR 60:005, Section 2(2)(eeee), 40 C.F.R. 60.4230 to 60.4248, Tables 1 to 4 (Subpart JJJJ), *Standards of Performance for Stationary Spark Ignition Internal Combustion Engines*. This regulation is applicable to Stationary Spark Ignition Combustion Engines that commenced construction on or after June 12, 2006.

Comments:

Manufacturer specifications were used for the calculation of NO_x and CO emission factors.

The engine is not a certified engine. Based on the emissions factors provided by the engine manufacturer, the emission of CO and NO_x are over the major source threshold. However, pursuant to 40 CFR 60.4236(b), after July 1, 2009, owners and operators may not install stationary SI ICE with a maximum engine power of greater than or equal to 500 HP that do not meet the applicable requirements in 40 CFR 60.4233. Pursuant to 40 CFR 60.4233(e), owners and operators of stationary SI ICE with a maximum engine power greater than or equal to 75 KW (100 HP) must comply with the emission standards in Table 1 of 40 CFR 60, Subpart JJJJ for their stationary SI ICE. According to Table 1 for non emergency SI natural gas engines greater than 500 hp, manufactured after 7/1/2010 must comply with NO_x and CO limits of 1.0 and 2.0 g/HP-hr respectively. Based on these emission factors, the emissions from the engine cannot exceed 16.95 tpy of NO_x and 33.91 tpy of CO. In order to meet compliance with the limits in 40 CFR 60, Subpart JJJJ, the engine has a Miratech 3-way catalyst control system for control of NO_x, CO and VOC. The control system manufacturer specifications identify target outlet emissions to be limited to 1.0 g/bhp-hr for NO_x, 2.0 g/bhp-hr for CO and 0 g/bhp-hr for VOC emissions. The calculated reduction for NO_x is 91.4% and 80% for CO.

The catalyst is integrated with the engine and has an auto cutoff such that when the exhaust temperature exceeds the catalyst manufacturer recommended values, the engine is automatically shut down.

The engine is a replacement for one of the three existing electric engines at the facility. The facility is not subject to 40 CFR 60, Subpart OOOOa, as the existing compressor is not being replaced. It is only the engine that drives the compressor that is being replaced. The change does not constitute a 'modification' under 40 CFR 60, Subpart OOOOa.

SECTION 3 – EMISSIONS, LIMITATIONS AND BASIS (CONTINUED)

Testing Requirements/Results

Emission Unit(s)	Control Device	Parameter	Regulatory Basis	Frequency	Test Method	Permit Limit (ppmvd @ 15% O ₂)	Test Result (ppmvd @ 15% O ₂)	Thruput and Operating Parameter(s) Established During Test	Activity Graybar	Date of last Compliance Testing
EP05	Oxidation Catalyst	CO	40 CFR 63, Subpart ZZZZ	Initial	Methods 3A and 19 (ASTM D6348-03)	47	5.97	770 bhp	CMN2013 0001	8/6/2013
				Annual		47	9.06	804 bhp	CMN2014 0001	8/19/2014
				Annual		47	8.70	729 bhp	CMN2015 0001	6/24/2015
				Annual		47	13.3	802 bhp	CMN2016 0001	6/29/2016
				Annual		47	2.3	799.33 bhp	CMN2018 0001	1/17/2018
				Annual		47	3.95	799.33 bhp	CMN2018 0002	10/17/2018
				Annual		47	4.01	731.33 bhp	CMN2019 0001	10/14/2019
EP06	TO	VOC/HAP		Initial and every 5 years	USEPA Method 25A	95% destruction efficiency	99.996	1369F outlet temperature	CMN2016 0002	10/12/2016
EP08	3-way catalyst	CO	40 CFR 60, Subpart JJJJ	Initial and every 8,760 hours of operation or 3 years, whichever comes first	Refer to Table 2 of 40 CFR 60, Subpart JJJJ for test methods	270 or 2.0 g/hp-hr	TBD	TBD	TBD	TBD
		NOx				82 or 1.0 g/hp-hr				
		VOC				60 or 0.7 g/hp-hr				

SECTION 4 – SOURCE INFORMATION AND REQUIREMENTS

Table A - Group Requirements:

Emission and Operating Limit	Regulation	Emission Unit
<90 tpy of VOC emissions <9 tpy single HAP <22.5 tpy combined HAPs	To preclude the applicability of 401 KAR 52:020, <i>Title V Permits</i>	Source-wide

Table B - Summary of Applicable Regulations:

Applicable Regulations	Emission Unit
401 KAR 59:015, New Indirect Heat Exchangers	EP06
401 KAR 60:005, Section 2(2)(eeee), 40 C.F.R. 60.4230 to 60.4248, Tables 1 to 4 (Subpart JJJJ), Standards of Performance for Stationary Spark Ignition Internal Combustion Engines	EP08
401 KAR 63:002, Section 2(4)(x), 40 C.F.R. 63.760 to 63.777, Appendix (Subpart HH), National Emission Standards for Hazardous Air Pollutants From Oil and Natural Gas Production Facilities	EP06
401 KAR 63:002, Section 2(4)(eeee), 40 C.F.R. 63.6580 to 63.6675, Tables 1a to 8, and Appendix A (Subpart ZZZZ), National Emission Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines	EP05, EP07, EP08

Table C – Summary of Precluded Regulations:

None

Table D - Summary of Non Applicable Regulations:

N/A

Air Toxic Analysis

N/A

Single Source Determination

N/A

SECTION 5 – PERMITTING HISTORY

Permit	Permit type	Activity#	Complete Date	Issuance Date	Summary of Action	PSD/Syn Minor
F0-10-011	Initial	APE20090003	2/21/2010	5/21/2010	Initial Operating Permit	N/A
F-15-018	Renewal	APE20140001	1/18/2015	9/15/2015	Initial Construction Permit	N/A
F-15-018 R1	Sig. Revision	APE20150001	11/18/2015	2/29/2016	Renewal	N/A
F-15-018 R2	Minor Revision	APE20160001	5/11/2016	5/19/2016	Added second process line, EP20 – EP23	N/A
F-15-018 R3	Admin. Amendment	APE20180001	10/01/2018	10/3/2018	Change of Ownership	N/A

SECTION 6 – PERMIT APPLICATION HISTORY

N/A

APPENDIX A – ABBREVIATIONS AND ACRONYMS

AAQS	– Ambient Air Quality Standards
BACT	– Best Available Control Technology
Btu	– British thermal unit
CAM	– Compliance Assurance Monitoring
CO	– Carbon Monoxide
Division	– Kentucky Division for Air Quality
ESP	– Electrostatic Precipitator
GHG	– Greenhouse Gas
HAP	– Hazardous Air Pollutant
HF	– Hydrogen Fluoride (Gaseous)
MSDS	– Material Safety Data Sheets
mmHg	– Millimeter of mercury column height
NAAQS	– National Ambient Air Quality Standards
NESHAP	– National Emissions Standards for Hazardous Air Pollutants
NO _x	– Nitrogen Oxides
NSR	– New Source Review
PM	– Particulate Matter
PM ₁₀	– Particulate Matter equal to or smaller than 10 micrometers
PM _{2.5}	– Particulate Matter equal to or smaller than 2.5 micrometers
PSD	– Prevention of Significant Deterioration
PTE	– Potential to Emit
SO ₂	– Sulfur Dioxide
TF	– Total Fluoride (Particulate & Gaseous)
VOC	– Volatile Organic Compounds